NUI Galway
OÉ Gaillimh

Autumn Examinations 2013/ 2014

Exam Code(s)	4BCT
Exam(s)	B.Sc. in Computer Science and Information Technology
Module Code(s)	CT417
Module(s)	Software Engineering III
Paper No.	1
Repeat Paper	Yes
External Examiner(s)	Prof. Liam Maguire
Internal Examiner(s)	Prof. G. Lyons Dr. Michael Madden Dr. David O'Sullivan * Dr. Owen Molloy *

Instructions: Candidates must attempt six questions from Section A (Dr. O'Sullivan), and five questions from Section B (Dr. Molloy).

Use separate answer books for each Section.

Duration 2 hours

No. of Pages 5

Requirements:
MCQ
Handout
Statistical/ Log Tables
Cambridge Tables
Graph Paper
Log Graph Paper
Other Materials

Release to Library: Yes ☐ No ☐

SECTION A

(Project Management – Dr. O'Sullivan)

Attempt 6 questions only (30 minutes).

All questions carry equal marks.

Make reference in your answers to personal experience, case studies and other reading.

1. Explain the expressions 'market push' and 'demand pull'. **[5]**
2. Kotter describes one of his steps as 'removing obstacles'. Explain. **[5]**
3. Explain two survey techniques used to gather requirements from stakeholders? **[5]**
4. Define a performance indicator. **[5]**
5. Indicate the key data points in a performance chart. **[5]**
6. How is creativity related to motivation? **[5]**
7. Explain how organisations can end up with a large number of low benefit and high-risk projects. **[5]**
8. What things can organisations do to create a successful team environment? **[5]**
9. Label and explain the important parts of the hype curve. Why is it important? **[5]**
10. How can the process used by IDEO for redesigning the shopping trolley be used for software development? **[5]**

SECTION B

(Software Quality – Dr. Molloy)

Attempt any 5 questions only (90 minutes).

All questions carry equal marks.

1. Different stakeholders in a project have different perspectives on software quality.

   i. Describe three main stakeholders in the development of an online book store such as Amazon
   ii. Using a quality model (e.g. McCall's quality factors), define the quality characteristics which the three stakeholders would require for the system.
   iii. Discuss the possible metrics you might use to measure those quality characteristics.

   [14]

2. For any 4 of the following metrics, (a) explain how it is measured, and (b) explain what it indicates regarding the quality of the system (e.g. maintainability).

   i. Comment Percentage
   ii. Fan-In
   iii. Cyclomatic Complexity
   iv. Depth of Inheritance Tree
   v. Weighted Methods Per Class
   vi. Number Of Children
   vii. Response For Class
   viii. Lack of Cohesion of Methods

   [14]

3. You are the manager of a recently formed software company that creates bespoke software applications for clients. Unfortunately, you have received a lot of complaints from customers regarding the number of performance, quality and general bugs in the software delivered to customers. You have decided to urgently put together a Process Improvement project to tackle these issues and their causes. Describe:

   i. The main phases of the project.
   ii. The activities you would envisage as part of the project.
   iii. How you would involve team members in the improvement project.
   iv. The tools you would use in each phase of the project.

   [14]

4. For each of the following types of waste in software development, give (a) an example of this type of waste, and (b) explain why it is considered undesirable.

i. Defects
ii. Extra (unnecessary) Processing.
iii. Extra Features.
iv. Delays
v. Task Switching.

[14]

5. You are developing a new mobile booking app for a theatre and its customers. There is limited time and budget available for the project, and you are unsure of which features will be most important for your potential customers. Potential features include:

- discounts for group bookings,
- joint offers with local restaurants,
- gift voucher purchase.

Describe how the Kano analysis method can be used to prioritise such requirements, and explain the procedure you would use to apply it.

[14]

6. Explain using examples and diagrams, where appropriate, the meaning of the following terms pertaining to the Scrum agile process:

- Sprint
- Product Backlog
- Sprint Backlog
- Daily Scrum
- Burndown Charts
- Sprint Retrospective

[14]

7. You are the manager of a software team implementing upgrades on a content management system. Some of the upgrades are urgent, and must be prioritised and processed as quickly as possible. The actual process follows a standard waterfall life cycle. Your boss has asked you to look at introducing Kanban to help manage the work of the team. Describe, using appropriate diagrams, how the process should work, and what its advantages might be.

[14]

8. A software development team is producing software with a very high level of defects, but you are unsure of the cause of the problems, or even if it is a constant or intermittent problem. Describe (using examples) how the following tools could be used in your analysis of the problem.

- Fishbone Diagram
- Pareto Chart
- Histogram
- Scatter Chart
- Control Chart

[14]